UNITED STATES PATENT APPLICATION

FOR

METHOD AND APPARATUS

FOR ADAPTIVE MESSAGE NOTIFICATION

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DESCRIPTION

Related Applications

[001]   This application is a continuation-in-part of U.S. Patent Application No. 10/083,793, entitled "METHOD AND APPARATUS FOR CALENDARED COMMUNICATIONS FLOW CONTROL," filed February 27, 2002, Attorney Docket No. 01-1007; U.S. Patent Application No. 10/083,792, entitled "VOICE MAIL INTEGRATION WITH INSTANT MESSENGER," filed February 27, 2002, Attorney Docket No. 01-1001; U.S. Patent Application No. 10/083,884, entitled "DEVICE INDEPENDENT CALLER ID," filed February 27, 2002, Attorney Docket No. 01-1002; and U.S. Patent Application No. 10/083,822, entitled "METHOD AND APPARATUS FOR A UNIFIED COMMUNICATION MANAGEMENT VIA INSTANT MESSAGING," filed February 27, 2002, Attorney Docket No. 01-1004, all of which claim priority to U.S. Provisional Patent Application Nos. 60/272,122, 60/272,167, 60/275,667, 60/275,719, 60/275,020, 60/275,031, and 60/276,505, and all of which are expressly incorporated herein by reference in their entirety.

[002]   Applicants also claim the right to priority under 35 U.S.C. § 119(e) based on Provisional Patent Application No. 60/428,704, entitled "DIGITAL COMPANION," filed November 25, 2002; and Provisional Patent Application No. 60/436,018, entitled "DIGITAL COMPANION," filed December 26, 2002, both of which are expressly incorporated herein by reference in their entirety.

[003]   The present application also relates to U.S. Patent Application No. 10/084,121, entitled "CALENDAR-BASED CALLING AGENTS," filed February 27, 2002, Attorney Docket No. 01-1008; U.S. Patent Application No. (_____), entitled "METHODS AND SYSTEMS FOR DRAG AND DROP CONFERENCE

CALLING," Attorney Docket No. 03-1012; U.S. Patent Application No.

(_____), entitled "METHODS AND SYSTEMS FOR CONFERENCE CALL

BUFFERING," Attorney Docket No. 03-1013; U.S. Patent Application No.

(_____), entitled "METHODS AND SYSTEMS FOR COMPUTER ENHANCED

CONFERENCE CALLING," Attorney Docket No. 03-1014; U.S. Patent Application

No. (_____), entitled "METHODS AND SYSTEMS FOR REMOTE CALL

ESTABLISHMENT," Attorney Docket No. 03-1015; U.S. Patent Application No.

(_____), entitled "METHODS AND SYSTEMS FOR CALL MANAGEMENT

WITH USER INTERVENTION," Attorney Docket No. 03-1016; U.S. Patent

Application No. (_____), entitled "METHODS AND SYSTEMS FOR

DIRECTORY INFORMATION LOOKUP," Attorney Docket No. 03-1017; U.S. Patent

Application No. (_____), entitled "METHODS AND SYSTEMS FOR

AUTOMATICALLY FORWARDING CALLS TO CELL PHONE," Attorney Docket No.

03-1018; U.S. Patent Application No. (_____), entitled "METHODS AND

SYSTEMS FOR A CALL LOG," Attorney Docket No. 03-1020; U.S. Patent

Application No. (_____), entitled "METHODS AND SYSTEMS FOR

AUTOMATIC FORWARDING OF CALLS TO A PREFERRED DEVICE," Attorney

Docket No. 03-1021; U.S. Patent Application No. (_____), entitled "METHODS

AND SYSTEMS FOR MULTI-LINE INTEGRATED DEVICE OR LINE

MANAGEMENT," Attorney Docket No. 03-1022; U.S. Patent Application No.

(_____), entitled "METHODS AND SYSTEMS FOR CONTACT

MANAGEMENT," Attorney Docket No. 03-1023; U.S. Patent Application No.

(_____), entitled "METHODS AND SYSTEMS FOR NOTIFICATION OF CALL

TO PHONE DEVICE," Attorney Docket No. 03-1024; U.S. Patent Application No.

(_____), entitled "METHODS AND SYSTEMS FOR SINGLE NUMBER TEXT

MESSAGING," Attorney Docket No. 03-1025; U.S. Patent Application No.

(_____), entitled "METHODS AND SYSTEMS FOR MULTI-USER

SELECTIVE NOTIFICATION," Attorney Docket No. 03-1026; U.S. Patent Application

No. (_____), entitled "METHODS AND SYSTEMS FOR CPN TRIGGERED

COLLABORATION," Attorney Docket No. 03-1027; and U.S. Patent Application No.

(_____), entitled "METHODS AND SYSTEMS FOR PREEMPTIVE

REJECTION OF CALLS," Attorney Docket No. 03-1028, all of which are expressly

incorporated herein by reference in their entirety.

Technical Field

[004] The present invention relates to methods and systems for providing a

user's preferred device with a notification of an incoming call or a voice mail for one

of a plurality of a user's devices other than the user's preferred device.

Background

[005] A wide variety of means exist for communication between users. For

example, a user may conduct phone calls via a home phone, work phone, and

mobile phone. In addition, users may also communicate using devices such as

PC's, PDA's, pagers, etc. using manners of communicating as email and instant

messaging.

[006] Unfortunately, managing such a wide variety of communication means

can be difficult. In particular, as a user changes location, communication with the

user may vary. For example, while on travel, it may only be possible to reach a user

by mobile phone. However, the user may best be reached by email while at work. Also, the user may wish to implement various rules for receiving and controlling communications. For example, to be reached at home, the user may want the home phone to ring three times before forwarding the call to a mobile phone. As another example, the user may wish to be paged each time an email is received from a particular person while away from the office.

[007] Typically, to implement communication management, a person must individually manage each communication device separately. Thus, when the user wishes to change how communication is managed, the user may have to deal with numerous devices and, perhaps, service centers.

[008] For example, previous notification systems, such as a pager notification from a voice mail server, require a calling party attempting to contact a user to send a message to a specific pager device. However, if the calling party instead dials the user's home phone number, the calling party might leave a voice mail on a voice mail system for a device currently inaccessible to the user. As a result, the user would not receive the voice mail until a later time.

[009] To keep apprised of communications, the user may dial into a voice mail system using an available device to check for messages or missed calls for unavailable devices. For example, if the user is away from the home or office, the user may have a cell phone for calling a work or home voice mail system to check for messages and missed calls. However, such an approach requires the user to dial into these voice mail systems periodically to check for messages and missed calls. As a result, the user may learn of missed calls and messages after a

significant passage of time. Alternatively, the user may spend time unnecessarily to check voice mail systems for nonexistent messages.

[010] Therefore, there is a need to provide an adaptive method and apparatus for providing a user's preferred device with a notification of a call or a voice mail for a device other than the user's preferred device. Accordingly, the user may receive timely notifications of incoming calls and voice mail messages.

SUMMARY

[011] Consistent with the present invention, as embodied and broadly described herein, methods and systems provide a user's preferred device with a notification of an incoming call or a voice mail for one of a plurality of a user's devices.

[012] An embodiment consistent with the principles of the present invention provides a method for providing a notification to a telephone user having a plurality of devices including a preferred device. Information indicating incoming data directed to one of a plurality of devices of the user is received, the data being in the form of one of a plurality of data types. A notification is transmitted to the user's preferred device, the notification including an identification of the type of the incoming data.

[013] An embodiment consistent with the principles of the present invention provides an apparatus for providing a notification to a telephone user having a plurality of devices including a preferred device. A first server function receives information indicating incoming data to one of a plurality of devices of the user, the data being in the form of one of a plurality of data types. A second server function

transmits a notification to the user's preferred device, the notification including an identification of the type of the incoming data.

[014] An embodiment consistent with the principles of the present invention provides a method for providing a notification to a telephone user having a plurality of devices including a preferred device. Information from a calling party calling one of the plurality of devices is received. A notification corresponding to the received information is generated. A signal is then generated to the preferred device to display a real-time notification.

[015] An embodiment consistent with the principles of the present invention provides an apparatus for providing a notification to a telephone user having a plurality of devices including a preferred device includes means for receiving information indicating incoming data to one of a plurality of devices of the user, the data being in the form of one of a plurality of types and means for transmitting a notification to the user's preferred device, the notification including an identification of the type of the incoming data.

[016] It is to be understood that both the foregoing general description and the following detailed description are exemplary and explanatory only and are not restrictive of the invention, as claimed. The accompanying drawings, which are incorporated in and constitute a part of this specification, illustrate several embodiments of the invention and together with the description, serve to explain the principles of the invention.

BRIEF DESCRIPTION OF THE DRAWINGS

[017] The accompanying drawings, which are incorporated in and constitute a part of this specification, illustrate one embodiment consistent with the invention and, together with the description, serve to explain the principles of the invention.

[018] Fig. 1 is a diagram of an exemplary data processing and telecommunications environment in which features and aspects consistent with the principals of the present invention may be implemented;

[019] Fig. 2 is a diagram of an exemplary user terminal, consistent with the principals of the present invention;

[020] Fig. 3 is a diagram of a voice network, consistent with the principles of the present invention;

[021] Fig. 4 is a block diagram of a service center, consistent with the principles of the present invention;

[022] Fig. 5 illustrates a logical architecture of an exemplary system, consistent with the present invention;

[023] Figs. 6 is an exemplary data structure used for providing caller identification information, in accordance with methods and apparatus consistent with the present invention;

[024] Fig. 7 is a diagram illustrating an overview of call notification and voice mail notification;

[025] Fig. 8 is a flow diagram illustrating a method for providing a call notification over a voice and data network consistent with the present invention; and

[026] Fig. 9 is a flow diagram illustrating a method for providing a voice mail notification over a voice and data network consistent with the present invention.

DETAILED DESCRIPTION

[027] Consistent with the principles of the present invention, a notification of an incoming call for one of a plurality of a user's devices is provided to the user's preferred device via a data network using a communications management service. The communications management service receives, from a telephone network, signaling information, including caller identification information, representing an incoming call from a calling party to one of a plurality of the user's devices. The communications management service determines which device the user has selected as a preferred device. The service may then provide a call notification to the user's preferred device, which may include the calling party's name and phone number, for example.

[028] Consistent with the principles of the present invention, a notification of a voice mail for one of a plurality of a user's devices is provided to the user's preferred device via a data network using a communications management service. The communications management service detects signaling information, including caller identification information, representing a voice mail from a calling party sent to one of a plurality of a user's devices. The communications management service determines which device the user has selected as a preferred device. The service may then provide a voice mail notification to the user's preferred device, which may include the calling party's name and phone number, for example.

[029] Reference will now be made in detail to exemplary embodiments of the present invention, examples of which are illustrated in the accompanying drawings. Wherever possible, the same reference numbers will be used throughout the drawings to refer to the same or like parts.

[030]   Fig. 1 is a block diagram of a data processing and telecommunications environment 100, in which features and aspects consistent with the present invention may be implemented. The number of components in environment 100 is not limited to what is shown and other variations in the number of arrangements of components are possible, consistent with embodiments of the invention. The components of Fig. 1 may be implemented through hardware, software, and/or firmware. Data processing and telecommunications environment 100 may include a data network 102, a voice network 104, and a service center 106. A user 110 may use a user terminal 112 to interface with data network 102 and may use phones 114, 116, and 118 to interface with voice network 104. A calling party 120 may use phone 122 to call a user, such as user 110, at any one of phones 114, 116, and 118.

[031]   Data network 102 provides communications between the various entities depicted in environment 100 of Fig. 1, such as user terminal 112 and service center 106. Data network 102 may be a shared, public, or private network and encompass a wide area or local area. Data network 102 may be implemented through any suitable combination of wired and/or wireless communication networks. By way of example, data network 102 may be implemented through a wide area network (WAN), local area network (LAN), an intranet, and/or the Internet. Further, service center 106 may be connected to multiple data networks 102, such as, for example, to a wireless carrier network and to the Internet.

[032]   Voice network 104 may provide telephony services to allow a calling party, such as calling party 120, to place a telephone call to user 110. In one embodiment, voice network 104 may be implemented using a network, such as the

Public Switched Telephone Network ("PSTN"). Alternatively, voice network 104 may be implemented using voice-over Internet Protocol ("VoIP") technology. In addition, voice network 104 may be implemented using both PSTN and VoIP technology consistent with the principles of the present invention. Further, service center 106 may be connected to multiple voice networks 104, such as for example, Verizon's™ Voice Network, voice networks operated by other carriers, and wireless carrier networks.

[033] Service center 106 provides a platform for managing communications over data network 102 and voice network 104. Service center 106 also provides gateway functions, such as code and protocol conversions, to transfer communications between data network 102 and voice network 104. Service center 106 may be implemented using a combination of hardware, software, and/or firmware. For example, service center 106 may be implemented using a plurality of general purpose computers or servers coupled by a network (not shown). Although service center 106 is shown with direct connections to data network 102 and voice network 104, any number and type of network elements may be interposed between service center 106, data network 102, and voice network 104.

[034] User terminal 112 provides an interface to data network 102 for user 110. For example, user terminal 112 may be implemented using any device capable of accessing the Internet, such as a general purpose computer or personal computer equipped with a modem. User terminal 112 may also be implemented in other devices, such as the Blackberry™, and Ergo Audrey™. Furthermore, user terminal 112 may be implemented in wireless devices, such as pagers, mobile phones (with

data access functions), and Personal Digital Assistants ("PDA") with network connections.

[035] User terminal 112 also allows user 110 to communicate with service center 106. For example, user 110 may use instant messaging ("IM") to communicate with service center 106. In addition, user terminal 112 may use other aspects of TCP/IP including the hypertext transfer protocol ("HTTP"); the user datagram protocol ("UDP"); the file transfer protocol ("FTP"); the hypertext markup language ("HTML"); and the extensible markup language ("XML").

[036] Furthermore, user terminal 112 may communicate directly with service center 106. For example, a client application may be installed on user terminal 112, which directly communicates with service center 106. Also, user terminal 112 may communicate with service center 106 via a proxy.

[037] Phones 114, 116, 118, and 122 interface with voice network 104. Phones 114, 116, 118, and 122 may be implemented using known devices, including wireline phones and mobile phones. Although phones 114, 116, 118, and 122 are shown directly connected to voice network 104, any number of intervening elements, such as a private branch exchange ("PBX"), may be interposed between phones 114, 116, 118, and 122 and voice network 104. One or more of phones 114, 116, 118, and 112 may be associated with user 110. For example, phone 114 may be a home phone billed to user 110, phone 116 may be a mobile phone billed to user 110, and phone 118 may be a home phone billed to a friend of user 110. Phones 114 and 116 may be billed to the same or different accounts of user 110, for example.

[038]   Fig. 2 is a block diagram of a user terminal consistent with the present invention. User terminal 112 includes a central processing unit (CPU) 200, a memory 202, a storage module 204, a network interface 206, an input interface 208, an output interface 210, an input device 212, and an output device 214.

[039]   CPU 200 provides control and processing functions for user terminal 112. Although Fig. 2 illustrates a single CPU, user terminal 112 may include multiple CPUs. CPU 200 may also include, for example, one or more of the following: a co-processor, memory, registers, and other processing devices and systems as appropriate. CPU 200 may be implemented, for example, using a Pentium™ processor provided from Intel Corporation.

[040]   Memory 202 provides a primary memory for CPU 200, such as for program code. Memory 202 may be embodied with a variety of components of subsystems, including a random access memory ("RAM") and a read-only memory ("ROM"). When user terminal 112 executes an application installed in storage module 204, CPU 200 may download at least a portion of the program code from storage module 204 into memory 202. As CPU 200 executes the program code, CPU 200 may also retrieve additional portions of program code from storage module 204.

[041]   Storage module 204 may provide mass storage for user terminal 112. Storage module 204 may be implemented with a variety of components or subsystems including, for example, a hard drive, an optical drive, CD ROM drive, DVD drive, a general-purpose storage device, a removable storage device, and/or other devices capable of storing information. Further, although storage module 204

is shown within user terminal 112, storage module 204 may be implemented external to user terminal 112.

[042]   Storage module 204 includes program code and information for user terminal 112 to communicate with service center 106. Storage module 204 may include, for example, program code for a calendar application, such as GroupWise provided by Novell Corporation or Outlook provided by Microsoft Corporation; a client application, such as a Microsoft Network Messenger Service (MSNMS) client or America Online Instant Messenger (AIM) client; and an Operating System (OS), such as the Windows Operation System provided by Microsoft Corporation. In addition, storage module 204 may include other program code and information, such as program code for TCP/IP communications; kernel and device drivers; configuration information, such as a Dynamic Host Configuration Protocol (DHCP) configuration; a web browser, such as Internet Explorer provided by Microsoft Corporation, or Netscape Communicator provided by Netscape Corporation; and any other software that may be installed on user terminal 112.

[043]   Network interface 206 provides a communications interface between user terminal 112 and data network 102. Network interface 206 may receive and transmit communications for user terminal 112. For example, network interface 206 may be a modem, or a local area network ("LAN") port.

[044]   Input interface 208 receives input from user 110 via input device 212 and provides the input to CPU 200. Input device 212 may include, for example, a keyboard, a microphone, and a mouse. Other types of input devices may also be implemented consistent with the principles of the present invention.

[045]   Output interface 210 provides information to user 110 via output device 214. Output device 214 may include, for example, a display, a printer, and a speaker. Other types of output devices may also be implemented consistent with the principles of the present invention.

[046]   Fig. 3 is a more detailed diagram of voice network 104, consistent with the principles of the present invention. As shown, voice network 104 includes an intelligent service control point (ISCP) 302, service transfer points (STP) 304 and 306, service switching points (SSP) 308 and 310, a line information database (LIDB) 312, an ISCP Service Provisioning And Creation Environment (SPACE) 314, a Recent Change Environment 316, and an Intelligent Peripheral (IP) 320.

[047]   Voice network 104 may be implemented using the PSTN and SS7 as a signaling protocol. The SS7 protocol allows voice network 104 to provide features, such as call forwarding, caller-ID, three-way calling, wireless services such as roaming and mobile subscriber authentication, local number portability, and toll-free/toll services. The SS7 protocol provides various types of messages to support the features of voice network 104. For example, these SS7 messages may include Transaction Capabilities Applications Part ("TCAP") messages to support event "triggers," and queries and responses between ISCP 302 and SSPs 308 and 310.

[048]   ISCP 302 may also be, for example, a standard service control point (SCP) or an Advanced Intelligent Network (AIN) SCP. ISCP 302 provides translation and routing services of SS7 messages to support the features of voice network 104, such as call forwarding. In addition, ISCP 302 may exchange information with the service center 106 using TCP/IP or SS7. ISCP 302 may be

implemented using a combination of known hardware and software. Although ISCP 302 is shown with a direct connection to service center 106 through ISCP SPACE 314, any number of network elements including routers, switches, hubs, etc., may be used to connect ISCP 302 and service center 106.

[049]   STPs 304 and 306 relay SS7 messages within voice network 104. For example, STP 304 may route SS7 messages between SSPs 308 and 310. STP 302 may be implemented using known hardware and software from manufacturers such as NORTEL™ and LUCENT Technologies™.

[050]   SSPs 308 and 310 provide an interface between voice network 104 and phones 114 and 120, respectively, to setup, manage, and release telephone calls within voice network 104. SSPs 308 and 310 may be implemented as a voice switch, an SS7 switch, or a computer connected to a switch. SSPs 308 and 310 exchange SS7 signal units to support a telephone call between calling party 120 and user 110. For example, SSPs 308 and 310 may exchange SS7 messages, such as TCAP messages, within message signal units ("MSU") to control calls, perform database queries to configuration database 312, and provide maintenance information.

[051]   Line Information Database (LIDB) 312 comprises one or more known databases to support the features of voice network 104. For example, LIDB 312 may include subscriber information, such as a service profile, name and address, and credit card validation information.

[052]   ISCP Service Provisioning and Creation Environment (SPACE) 314 may be included as part of ISCP 302 or be separate from ISCP 302. For example, a

Telcordia™ ISCP may provide the functions of SPACE 314 as part of system 100. Further, ISCP SPACE 314 may include one or more servers. ISCP SPACE 314 is the point in the ISCP platform where user record updates may be made.

[053] In one embodiment, user records may be stored in ISCP SPACE 314 such that the records may be updated and sent to ISCP 302. These records may include information regarding how to handle calls directed to the user. For example, these user records may include information regarding whether or not calls for the user are to be forwarded to a different number, and/or whether or not the call should be directed to an IP, such as a voice mail system, after a certain number of rings. Additionally, one ISCP SPACE 314 may provide updates to one or more ISCPs 302 via an ISCP network (not shown).

[054] Additionally, voice network 104 may include one or more recent change engines 316 such as, for example, an Enterprise Recent Change engine (eRC); an Assignment, Activation, and Inventory System (AAIS); or a multi-services platform (MSP). As an example, the eRC and AAIS may be used in voice networks 104 located in the western part of the United States, while an MSP may be used in networks in the eastern part. The recent change engines may be used to update switch and ISCP databases. For example, a recent change engine may deliver database updates to SSPs and to ISCPs, such that when updating databases, these recent change engines emulate human operators. Additionally, if the instructions are to be sent to an ISCP 302, the recent change engine may first send the instructions to ISCP SPACE 314, which then propagates the instructions to ISCP 302 as discussed above. Further, an MSP may be used, for example, for providing

updates to both SSPs 308 or 310 and ISCPs 302. Alternatively, an eRC may be used, for example, to provide updates to SSPs 308 or 310, while an AAIS is used for providing updates to ISCPs 302.

[055] Additionally, voice network 104 may include one or more intelligent peripherals (IP). As shown, for example, in Figure 4, an IP 320 is illustrated as being connected to SSP 308. These IPs may be used for providing services, such as voice mail services.

[056] Fig. 4 is a block diagram of service center 106, consistent with the principles of the present invention. As shown, service center 106 may include firewalls 402 and 404, one or more digital companion servers 406, one or more communication portal servers 408, one or more network access servers 410, and a voice portal 412. Voice portal 412 may include a voice portal application server 414 and a voice recognition server 416. A network 418 may be used to interconnect the firewalls and servers. Additionally, back end server(s) 420 may be provided between the service center 106 and voice network 104.

[057] Firewalls 402 and 404 provide security services for communications between service center 106, data network 102, and voice network 104, respectively. For example, firewalls 402 and 404 may restrict communications between user terminal 112 and one or more servers within service center 106. Any appropriate security policy may be implemented in firewalls 402 and 404 consistent with the principles of the present invention. For example, firewalls 402 and 404 may be implemented using a combination of known hardware and software, such as the Raptor Firewall provided by the Axent Corporation. Further, firewalls 402 and 404

may be implemented as separate machines within service center 106, or implemented on one or more machines external to service center 106.

[058] Network 418 may be any appropriate type of network, such as an Ethernet or FDDI network. Additionally, network 418 may also include switches and routers, as appropriate, without departing from the scope of the invention. Further, additional firewalls may be present in network 418, for example, to place one or more of servers 406, 408, 410, or voice portal 412 behind additional firewalls.

[059] Each server (406, 408, 410, 414, 416, 420) may be any type of appropriate server or computer, such as a Unix or DOS based server or computer. The servers may implement various logical functions, such as those described below. In Figure 4, a different server is illustrated as being used for each logical function. In other embodiments, the logical functions may be split across multiple servers, multiple servers may be used to implement a single function, all functions may be performed by a single server, etc.

[060] In general, a digital companion server 406 may provide the software and hardware for providing specific services of service center 106. Exemplary services include, for example, permitting a user 110 to add contacts to an address book from a history of calls made or received by user 110, permitting a user 110 to make calls from numbers retrieved from their address book, scheduling a call to be placed at a specific time, or permitting the user 110 to access and view a name and/or address associated with a phone number. Additionally, these services may include permitting the user 110 to listen to voice mail messages on-line over the Internet, forward their calls based on a scheduler and/or the calling parties number,

setting up conference calls on-line, etc. Particularly, the user may receive a notification of incoming calls, voice mail messages, and SMS messages for devices 114-122 other than the user's home phone 112.

[061]   A communication portal server 408 may provide the hardware and software for managing a user's account and interfacing with user account information stored by the provider of user's voice network 104. Network access servers 410 may provide the hardware and software for sending and receiving information to voice network 104 in processing the applications provided by the service center. For example, network access servers 410 may be used for transmitting and/or receiving information from/to an ISCP 302 or an SSP 308 or 310 of voice network 104.

[062]   Voice portal 412 includes software and hardware for receiving and processing instructions from a user via voice. For example, a user may dial a specific number to directly access voice portal 412. Then the user, using speech, may provide instructions for service center 106 to modify the services to which the user subscribes. Voice portal 412 may include, for example, a voice recognition function 416 and an application function 414. Voice recognition server 416 may receive and interpret dictation, or recognize spoken commands. Application function 414 may take, for example, the output from voice recognition server 416, convert it to a format suitable for service center 106 and forward the information to one or more servers (406, 408, 410) in service center 106.

[063]   Fig. 5 illustrates a logical architecture of an exemplary system, consistent with the present invention. As illustrated, the logical architecture may be

split into four sections, or planes: client side 502, application service 504, network access 506, and voice network plane 508.

[064]   Client side 502 includes user terminals 112_A and 112_B that a user may use to send and/or receive information to/from service center 106. Additionally, client side 502 includes user's phone(s) 114.   As discussed above, user terminals 112 may be any type of appropriate device a user may use for communicating with Service Center 106. For example, user terminal 112_A may be a PDA running a program for communicating with Service Center 106, while user terminal 112_B may be a desktop type computer running a web browser for communicating with Service Center 106 via the Internet. Additionally, the user may have one or more phones 114, such as, for example, one or more standard landline telephones and/or wireless phones.

[065]   Application service plane 504 includes digital companion server(s) 406, communication portal server(s) 408, and voice portal 412. These entities may communicate between one another using, for example, web services or any other suitable protocols. Web services are a standardized way of integrating Web-based applications using the Extensible Markup Language (XML), Simple Object Access Protocol (SOAP), Web Services Description Language (WSDL) and Universal Description, Discovery and Integration (UDDI) open standards over an Internet protocol (IP) backbone.

[066]   As illustrated, digital companion server 406 may provide the following functions: a client proxy 512, a web server 514, an application server function 516, a calendar server function 518, a notification server function 520, and a database

server function 522. Each of these functions may be performed in hardware, software, and/or firmware. Further, these functions may each be executed by a separate server, split across multiple servers, included on the same server functions, or any other manner.

[067] Client proxy function 512 provides a proxy function for the digital companion that may be used for security purposes. This client proxy function 512 may be included in a separate server such that all communications sent from the other digital companion functions/servers to a user terminal 112 via data network 102 go through client proxy 512. Also, if client proxy 512 is included on a separate server, for example, an additional firewall may be provided between client proxy 512 and the other digital companion servers to provide additional security.

[068] Web server 514 provides functionality for receiving traffic over data network 102 (Fig. 1) from a user. For example, web server 514 may be a standard web server that a user may access using a web browser program, such as Internet Explorer or Netscape Communicator.

[069] Application server function 516 encompasses the general functions performed by digital companion server(s) 406. For example, these functions may include interfacing with the various other digital companion functions to perform specific applications provided by the service center. These services may include, for example, interfacing with other function(s), software, and/or hardware to provide a user with the capability of managing their calls online. For example, permitting a user to add contacts to their address book from a history of calls made or received by the user, permitting a user to make calls directly from their address book,

scheduling a call to be placed at a specific time, or permitting the user to look at the name and/or address associated with a phone number. Additionally, these services may include permitting the user to listen to their voice mail on-line, forwarding their calls based on a scheduler and/or the calling parties number, setting up conference calls on-line, etc.

[070] Consistent with the present invention, a communications notification service provides a user with a notification on the user's preferred device of an incoming communication for one of a plurality of the user's devices. Examples of incoming communications include voice, email, instant messages, SMS messages, etc. Also, consistent with the present invention, a voice mail notification service provides a user with a notification on the user's preferred device of a voice mail for one of a plurality of the user's devices.

[071] Additionally, application server function 516 may interface with one or more external devices, such as an external web server, for retrieving or sending information. For example, application server function 516 may interface with a voice network's data center 556 (e.g., verizon.com) to determine the services to which the user subscribes (e.g., call waiting, call forwarding, voice mail, etc.).

[072] Calendar server function 518 may provide the capability of scheduling events, logging when certain events occurred, triggering the application-functions to perform a function at a particular time, etc.

[073] Notification server function 520 provides the capability to send information from service center 106 to a user terminal 112. For example, notification server function 520 at the direction of application server function 516 may send a

notification to user terminal 112 that the user is presently receiving a phone call at user's phone 114.

[074] Database function 522 stores information, in the form of databases, useable by the various applications executed by the digital companion servers. These databases may be included in, for example, one or more external storage devices connected to the digital companion servers. Alternatively, the databases may be included in storage devices within the digital companion servers themselves. The storage devices providing database function 522 may be any type of storage device, such as for example, CD-ROMs, DVD's, disk drives, magnetic tape, etc.

[075] As discussed above, communication portal server(s) 408 provide the hardware and software for managing a user's account and interfacing with user account information stored by the provider of user's voice network 104. As illustrated in Figure 5, communication portal server 408 may provide the following functions: a web server function 526, an application server function 528, a contacts database function 530, and/or a user profile function 532.   Each of these functions may be performed by a separate server, split across multiple servers, included on the same server functions, or any other manner.

[076] Web server function 526, as with web server function 514 of the digital companion servers, provides functionality for receiving traffic over data network 102 from a user. For example, the web server may be a standard web server that a user may access using a web browser, such as Internet Explorer or Netscape Communicator.

[077] Application server function 528 encompasses the general functions performed by communication portal servers 408. For example, these functions may include interfacing with the voice network to retrieve and/or modify user profile information, and creating and editing an address book for the user. Additionally, application server function 528 may include the functionality of sending and/or receiving information to/from external servers and/or devices. For example, communication portal servers 408 may be connected to a network, such as, the Internet. Application server function 528 may then provide connectivity over the Internet to external servers 552 that provide web services, such as the Superpages webpage. Application function 528 may then contact these external services 552 to retrieve information, such as an address for a person in the user's address book.

[078] In another example, application server function 528 of communication portal 408 may interface a single sign on (SSO) server 554. SSO 554 may be used to allow users to access all services to which the user subscribes, on the basis of a single authentication that is performed when they initially access the network.

[079] Contacts database 530 includes storage devices for storing data forming an address book for the user. This address book may be any appropriate type of address book. For example, the user's address book may include the names, phone numbers, and addresses of people and/or organizations. These storage devices may be internal or external to communication portal servers 406 or some combination in between. In addition, these storage devices may be any type of storage device, such as magnetic storage, memory storage, etc.

[080]   User profile database 532 includes storage devices for storing user profile information for the user. These storage devices may be the same or separate storage devices used for the contacts database. The user profile may include information regarding the user's account for their voice network. For example, this information may include the user's name, billing address, and other account information. Additionally, the user profile may include information regarding voice services to which the user subscribes, such as, for example, call waiting, voice mail, etc.

[081]   Additionally, application services plane 504 of the architecture may include voice portal 412. As discussed above, voice portal 412 may include, for example, a voice recognition server 416 and an application server function 414, and be used for receiving and processing instructions from a user via voice. The voice recognition function may be implemented using hardware and/or software capable of providing voice recognition capabilities. This hardware and/or software may be a commercially available product, such as the Voice Application platform available from Tellme Networks, Incorporated. Application server function 414 of voice portal 412 may include hardware and/or software for exchanging information between digital companion servers 406 and voice recognition server 416. Additionally, application server function 414 may be included on a separate server, included in the hardware and software providing voice recognition server 416, included in digital companion servers 406, etc.

[082]   Network Access plane 506 of the architecture includes the functions for providing connectivity between application service plane 502 and voice network 104.

For example, this plane may include recent change engines 316, network access servers 410, and/or back end servers 420.

[083]   As discussed above, recent change engines 316 may be used to update switches and ISCP databases included in the voice network 104. In one embodiment, recent change engines 316 may include an AAIS 544, an eRC 546, and/or an MSP 548. Alternatively, the ISCP and its databases may be accessed and modified directly. Additionally, a proxy 542 may be used between digital companion servers 406 and recent change engines 542 for security purposes.

[084]   Network access servers 410 may be included in the service center 106 and may provide the hardware and software for sending and receiving information to the voice network 410 in processing the applications provided by the service center. For example, network access servers 410 may include a Caller ID (CID) functionality for retrieving caller ID information from voice network 104, a click to dial (CTD) functionality for instructing an intelligent peripheral (IP) in the voice network to place a call via an SSP, and/or a real time call management (RTCM) functionality for interfacing with an ISCP of the voice network.

[085]   Network Access plane 506 may also include one or more back end server(s) 420. These back end server(s) 420 may include hardware and/or software for interfacing service center 106 and voice network 104. Back end server(s) 420 may be connected to service center 106 by a network, by a direct connection, or in any other suitable manner. Further, back end server(s) 420 may connect to one or more devices in voice network 104 by a network, a direct connection, or in any other suitable manner.

[086] Back end server(s) 420 may include, for example, a server providing a voice mail retrieval and notification function. For example, this voice mail retrieval and notification function may communicate with a voice mail storage system on IP 320 to receive signals when a voice mail message is stored in a user's voice mail box, send appropriate codes to retrieve the voice mail message, retrieve the voice mail message, convert the voice mail message to a digital file, and send it to digital companion servers 406.

[087] Additionally, back end server(s) 420 may include, for example, a directory assistance server. This directory assistance server may, for example, interface service center 106 with a Reverse Directory Assistance Gateway (RDA Gateway) of voice network 104. A RDA Gateway is a device for issuing requests to a Data Operations Center (DOC) of voice network 104 for name and/or address information associated with a phone number and receiving the name and/or phone number in response to this request.

[088] In another example, back end server(s) 420 may include a wireless internet gateway that is used for interfacing with a mobile switching center (MSC) of a wireless voice network. As with the above-described back end server(s) 420, this wireless internet gateway may be used for converting requests and information between the formats used by service center 106 and those used by the wireless voice network.

[089] In yet another example, back end server(s) 420 may include a conference blasting server for instructing a conference bridge in the voice network 106 to dial out via an SSP to the participants of a voice conference. Alternatively,

back end server(s) may include, for example, a server for instructing an IP of the voice network to place a call between two parties by dialing out to each of the parties. The back end server(s) may also include the capability to instruct the bridge or IP device to call an audio digitizing device that can listen to the conference, convert the audio signals to digital format, and forward the digitized signals to a user device via, for example, an audio streaming server. The audio streaming server may, for example, allow a user to connect to it via, for example, the Internet. Additionally, the audio streaming device may buffer or record the signals to permit the user to pause, rewind, and/or fast-forward thru the conference.

[090] In yet another example, back end server(s) 420 may include a Single Number Short Message Service (SN SMS) server for interfacing service center 106 with a SMS gateway in the voice network 104. This may be used for example to direct SMS messages addressed to the number of a user's home phone 114 to an SMS-capable device of the user's choosing such as phone 116.

[091] Voice network plane 508 includes the hardware and software included in voice network 104, as discussed above with reference to Fig. 3. For example, voice network plane 508 may include ISCP SPACE 314, ISCP 302, intelligent peripherals 320, and SSP 310. Additionally, voice network plane 508 may also include the hardware and software included in a wireless carrier's network, such as, for example, the mobile switching center, etc.

[092] In an exemplary embodiment consistent with the present invention, one or more communication devices associated with a user are monitored for incoming communication data. Communication data may be a missed, a notification

of a waiting voice mail message, or the like. For example, a calling party may use phone 122 to place a standard telephone call over voice network 508 to the user. SSP 310 may exchange the call to ISCP 302, which may forward the call to network access level 506 at one of network access servers 410.

[093] As previously discussed, network access servers 410 may include a Caller ID (CID) functionality for retrieving caller ID information from the voice network 104. Accordingly, the CID functionality of network access servers 410 may extract caller identification information from the calling party's call, such as the information displayed in the exemplary data structure depicted in Fig. 6.

[094] Fig. 6 is a caller ID notification data structure, in accordance with methods and apparatus consistent with the principles of the present invention. A caller ID notification data structure table 600 illustrates the type of information available to a user when a caller ID is received. Each line of caller ID notification data structure table 600 represents a caller ID notification event. Each caller ID notification event includes a time 620, a date 622, and caller ID 624, which may be a calling party's name or phone number, or both. An audio file 626 may also be provided and may include a voice message. The caller ID is information specifies the source of a call.

[095] The caller ID information may be passed to application service level 504 (Fig. 5), and more particularly, to digital companion server 406. Once received by the notification server 520, the caller ID information is stored by database function 522. Database function 522 provides for the storage of information useable by the various applications executed by digital companion server 406.

[096] As shown in Fig. 5, application server function 528 encompasses the

general functions performed by communication portal servers 408. For example,

these functions may include interfacing with the voice network to retrieve and/or

modify user profile information, and creating and editing an address book for the

user. Additionally, application server function 528 may include the functionality of

sending and/or receiving information to/from external servers and/or devices.

[097] To select a preferred device for receiving notifications, the user may,

for example, communicate with digital companion server 406 by executing digital

companion client software on terminal 112_B. For example, the user may access a

web page resident in digital companion server 406 to enter the telephone number or

other identifying indicator specifying the preferred device. Alternatively, the user

may use phone 114 to place a call to a service number at voice portal 412 whereby

the user may interact with automated voice response menus or may speak with a

user service representative to specify a preferred device. In yet another alternative,

user 110 may interact with digital companion client software on terminal 112_A to

transmit a phone number of the preferred device to digital companion server 406.

The identity of the device specified by the user as the preferred device is stored in

database 522.

[098] After initialing specifying a preferred device, the user may

subsequently change the preferred to device to a different device by repeating the

aforementioned process. Additionally, the user may specify a particular preferred

device for receiving notifications based on the time of day or week. As such, the

user may set in advance time periods during which different devices are specified as

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preferred devices to receive notifications. As is apparent to one of skill in the art, a variety of methods and systems may be implemented to facilitate the user's selection of a preferred device in keeping with the spirit and scope of the present invention.

[099] Application server function 516 may determine the preferred device, as specified by the user, by querying database function 522. The user may have previously selected a phone, such as phone 114, user terminal 112_A, or user terminal 112_B as a preferred device. For example, phone 114 may be a landline or wireless phone, user terminal 112_A may be client software, for example, and user terminal 112_B may include a web browser for web-based viewing of alerts.

[0100] Application server function 516 may also determine whether the user is currently logged into a digital companion client or currently has a preferred device logged on application service/business logic plane 504. If it is determined that no such log-ons currently exist, then any call notifications stored in database function 522 are not sent until such time as the user next logs on or turns on a device 112_A, 112_B, or 114 making a data or voice connection with application service/business logic plane 504. For example, when a device becomes active, database 522 may be queried by application server function 516 for notifications that have not been sent and then may send the saved notifications.

[0101] Client proxy function 512 provides the capability to send information from digital companion server 406 to a user terminal 112. For example, after the user's preferred device is determined from database 522, client proxy function 512, at the direction of application server function 516, sends an incoming call notification

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to the user's preferred device. For example, if the user has previously selected phone 114 as a preferred device, then client proxy function 512 sends the notification to voice portal 412. Voice portal 412 may convert the call notification into a voice message using, for example, voice recognition server 416 at the direction of application server 414, which then sends the incoming call notification to phone 114.

[0102] Alternatively, if the user's preferred device is user terminal 112_A, then client proxy function 512 sends the notification to user terminal 112_A. As another exemplary alternative, if the user's preferred device is user terminal 112_B, client proxy function 512 sends the notification to communications portal 408, which includes web server 526. Application server 528 may process the notification and sent it to user terminal 112_B.

[0103] The incoming call notification sent to the user's preferred device may consist of a text message, for example, indicating an incoming call. The message may indicate the name and phone number of the calling party. For example, if the notification is sent to user terminal 112_A, the client software therein may display the notification. If the notification is sent to user terminal 112_B, the notification may be displayed as part of an HTML page loaded on a web browser. Additionally, if the preferred device is phone 114, phone 114 may simply ring, and display the caller ID information, including the name and phone number of the calling party on a display screen.

[0104] In another exemplary embodiment consistent with the present invention, one or more phones belonging to a user and associated voice mail mailboxes contained in database 522 are monitored for new voice mail messages.

For example, a calling party may use phone 122 to leave a voice mail message for the user. The voice mail message may be processed by one of back end servers 420, which may include, for example, a server providing a voice mail retrieval and notification function. For example, the voice mail retrieval and notification function may include the capability to send notifications when a voice mail message is stored, physically call a user's voice mail system, enter the appropriate codes to retrieve the voice mail, retrieve the voice mail, convert the voice mail to a digital file, and send the digital file to digital companion server 406. Additionally, the voice mail may be stored on the server providing the voice mail retrieval and notification function.

[0105] Digital companion server 406 may monitor and periodically query back end server 420 providing the voice mail retrieval and notification function using notification server function 520 for new voice mail messages for any number of a user's devices. For example, once a voice mail is detected for the user, the voice message retrieval and notification server may transmit the information depicted in Fig. 6 describing and including the voice mail to notification server 520. Audio file 626 may store the voice mail message of the calling party.

[0106] The information in data structure 600 (Fig. 6) received by the notification server function 520 (Fig. 5) is stored by database function 522. The application server function 516 may determine the user's preferred device and determine whether the user is logged onto the network through any device. The user may have previously selected one of phone 114, user terminal 112_A, or user terminal 112_B as a preferred device. For example, phone 114 may be a landline or

wireless phone, user terminal 112_A may be client software, for example, and user terminal 112_B may include a web browser for web-based viewing of alerts.

[0107] Once the user's preferred device is determined, client proxy function 512 may send a voice mail notification to the user's preferred device. The voice mail notification may consist of a text message, for example, indicating a new voice message. The message may include the name and phone number of the calling party. Additionally user terminal 112 may provide user 110 with the option of selecting a function to playback the voice mail audio file 626.

[0108] In another exemplary embodiment consistent with the present invention, the user may specify phone numbers or persons from which the user would like to receive incoming call notifications and voice mail notifications. For example, the user may access the Internet via user terminal 112_B. Contact information may be stored on contacts database 530. Contact information may be transmitted from contacts database 530 to database function 522 of digital companion server 406.

[0109] For example, before sending a call notification to the user's preferred device, application server function 516 may check to determine the user's preferences for receiving call notifications. If the user has preset preferences by using user profile 532 to allow a call notification from a particular calling party 120, then the call notification is transmitted to the user's preferred device. However, if the user has preset preferences using user profile 532 to block call notifications from the calling party, then the call notification is not transmitted to the user's preferred

device. Similarly, the user may allow and block voice mail notifications by establishing preset preferences for voice mail notifications in a similar fashion.

[0110] In another exemplary embodiment of the present invention, the user may specify time periods during which the user would like to receive incoming call notifications and voice mail notifications. Using user profile 532, the user may decide times of the day or times of the week during which incoming call notifications and voice mail notifications are sent to the user's preferred device.

[0111] In another exemplary embodiment of the present invention, the user may determine the devices and time periods that the user would like to receive incoming call and voice mail notifications by using an address book function of the preferred device. The address book function may interact with contacts database 530, or with database function 522, for example.

[0112] In another exemplary embodiment of the present invention, the user may determine the persons or phone numbers from which the user would like to receive incoming call notifications and voice mail notifications by using a calendar function. For example, calendar server 518 may store a calendar accessible by phone 114, user terminal 112_A, or user terminal 112_B. The use may then indicate specific days and times during which the user would like to receive call notifications and voice mail notifications from particular persons or telephone numbers.

[0113] In another exemplary embodiment of the present invention, using an Internet browser on user terminal 112_B, the user may navigate via web pages and select and establish preferences for receiving call notifications and voice mail

notifications. For example, the user may specify more than one phone number to monitor for incoming calls and voice mails using a web page.

[0114] Fig. 7 is a diagram illustrating an overview of incoming call and voice mail notification. An incoming call or voice mail may originate in either data network 102 or voice network 104. Intelligent service control point 302 handles the caller identification information, which is then sent to digital companion server 406. Digital companion server 406 includes functionality for determining a preferred device of the called party as previously described. Once a preferred device is determined, the call notification or the voice mail notification may be sent to a user's previously selected preferred device 710.

[0115] More particularly, call notifications and voice mail notifications may be sent in one or more formats to the user's preferred device 710. For example, if the user's preferred device is a web-based client, then the call or voice mail notification is sent to the Internet for display on a webpage. If the user's preferred device is a phone, then the call or voice mail notification is converted to an appropriate text message for display on the phone's screen or is converted to an audio file using software and is sent to a phone number via a voice portal. If the user's preferred device is a digital companion client, then the call or voice mail notification is formatted and sent to the digital companion client for display as a notification. If the user's preferred device is an instant message client, then the call or voice mail notification is formatted and sent to the instant message client as a text message. If the user's preferred device is a device capable of receiving a SMS message, then the call or voice mail notification is formatted in the SMS message format and sent to

the device. If the user's preferred device is an e-mail account, then the call or voice mail notification is formatted as an e-mail message and sent to an e-mail address. If the user's preferred device is a pager, then the call or voice mail notification is formatted as a pager message and sent to a paper number. One of ordinary skill in the art will recognize that the above preferred devices are exemplary, and consistent with the present invention, other devices and message formats may be used for sending and receiving call and voice mail notifications.

[0116] Fig. 8 is a flow diagram illustrating a method of providing a call notification over a voice and data network consistent with the present invention. A switch (such as SSP 310, Figure 5) detects and receives a call placed by a calling party 120 to user phone 114 and forwards the call to network access server 410 (step 810). A call may be detected by configuring SSP 310 to trigger an alert to be sent to ISCP 302 whenever a call is placed to a user's phone.

[0117] After network access servers 410 receive the call (step 810), network access servers 410 may forward caller ID information from the call to digital companion server 406 (step 820). Digital companion server 406 may initiate an application server function 516 to determine the user associated with the called phone (step 830). Application server function 516 may next determine the user's preferred device (step 840). Next, application server function 516 may determine whether the user has specified whether the user desires to receive call notifications from the calling party at a particular time of day or day of the week, for example (step 850). If the user does not want to receive a call notification, the process ends

(step 860). However, if the user would like to receive notifications, then notification server 520 may send a call notification to the user's preferred device (step 870).

[0118] Fig. 9 is a flow diagram illustrating a method of providing a voice mail notification over a voice and data network consistent with the present invention. A voice mail message is detected from a calling party (step 910). A voice mail may be detected by configuring SSP 310 to trigger an alert to be sent to ISCP 392 whenever a voice mail is left for the user.

[0119] Back end servers 420 receive voice mail and caller ID information from the calling party over the voice network 508 and forward the voice mail and caller ID information to the digital companion server 406 (step 920). Digital companion server 406 may initiate an application server function 516 to determine the user associated with the called phone (step 930). Next, application server function 516 may determine the user's preferred device (step 940). Application server function 516 may then determine whether the user has specified whether the user desires to receive voice mail notifications from the calling party at a particular time of day or day of the week, for example (step 950). If the user does not want to receive a voice mail notification, the process ends (step 960). However, if the user would like to receive notifications, then notification server 520 may send a voice mail notification to the user's preferred device (step 970).

[0120] Other embodiments of the invention will be apparent to those skilled in the art from consideration of the specification and practice of the invention disclosed herein. It is intended that the specification and examples be considered as

exemplary only, with a true scope and spirit of the invention being indicated by the

following claims.